

**Kerbala University
College of Pharmacy
Dep. of Pharmaceutical Chemistry
Organic Pharmaceutical Chemistry IV**



By:

**Zaid Al-Obaidi
Assistant Lecturer in Pharmaceutical Chemistry
MSc Pharmaceutical Analysis
Sheffield, UK**

Rational For the Use of Prodrugs

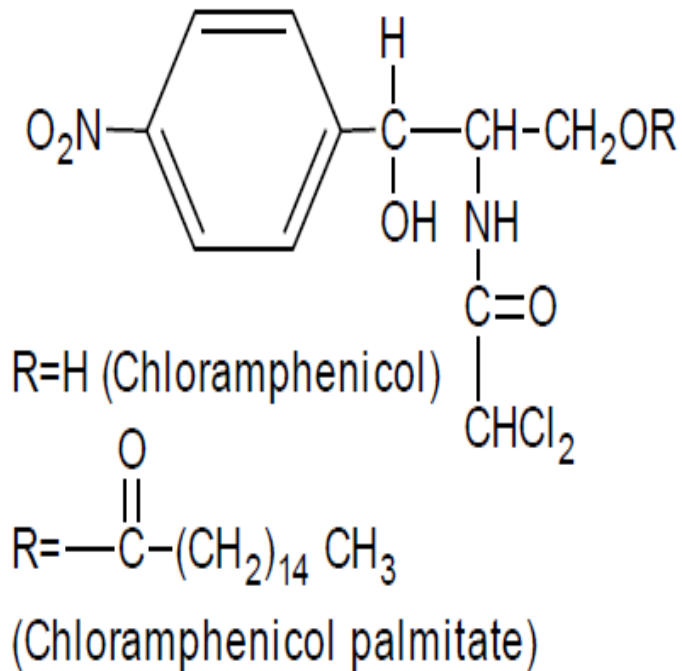
- The three major phases involved in the drug receptor interaction or biological bioavailability of drug includes:
 1. the **pharmaceutical** phase,
 2. the **pharmacokinetic** phase, and
 3. **pharmacodynamic** phase.

Use of Prodrugs to Overcome Pharmaceutical Barriers:

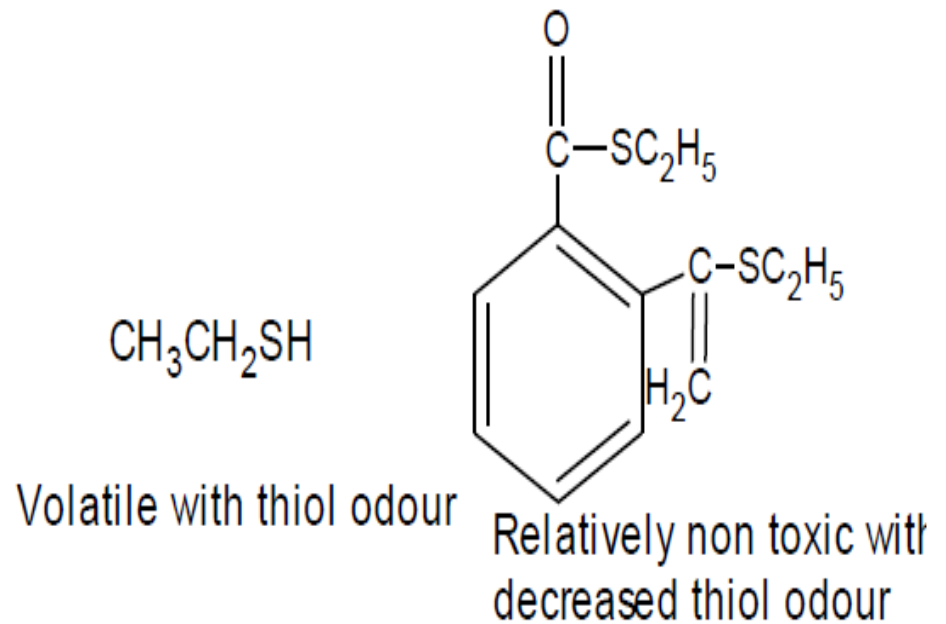
- A. Masking Taste or Odour**
- B. Minimizing Pain at Site of Injection**
- C. Alteration of Drug Solubility**
- D. Enhancement of Chemical Stability**

Masking Taste or Odour

(a) Chloramphenicol prodrug

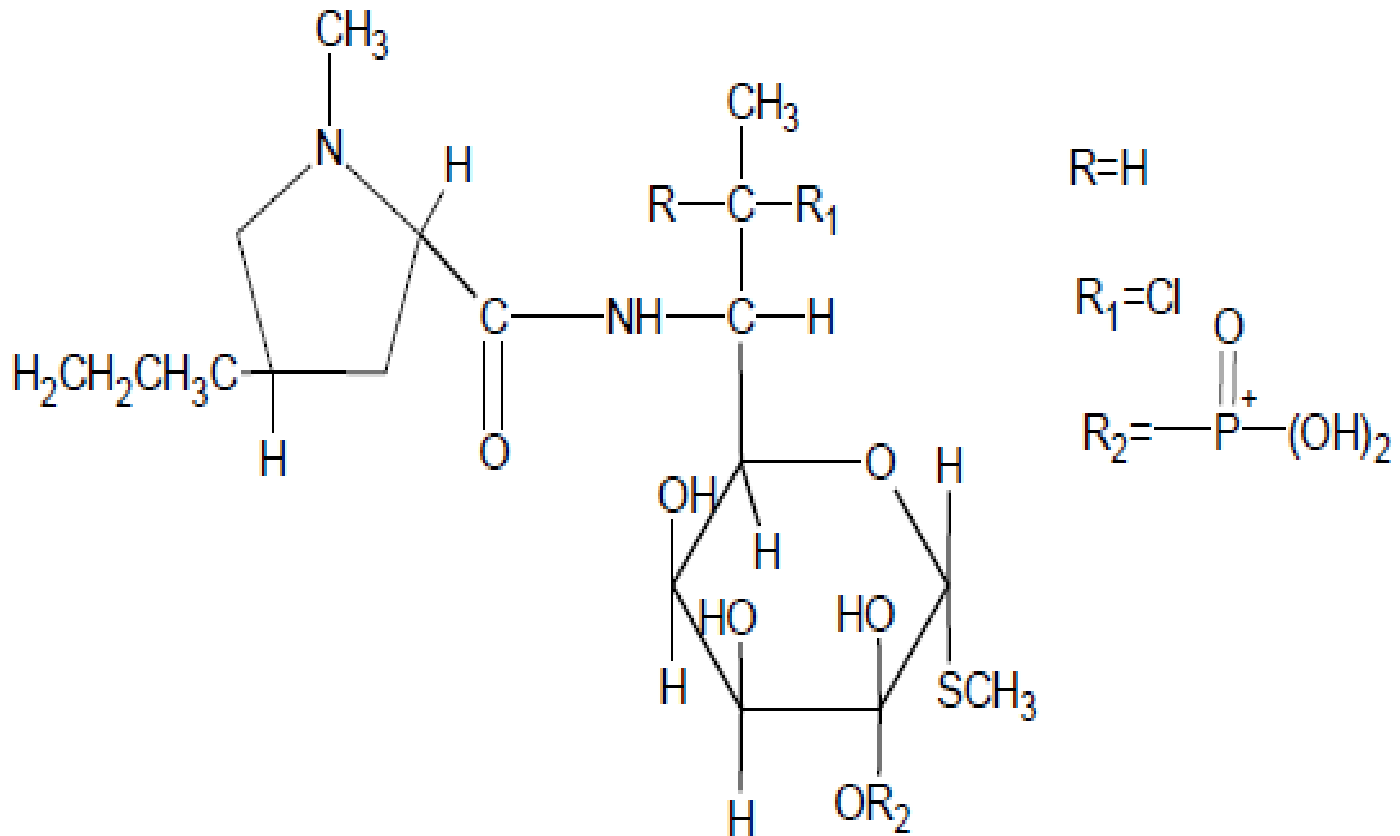


(b) Mercaptane prodrug

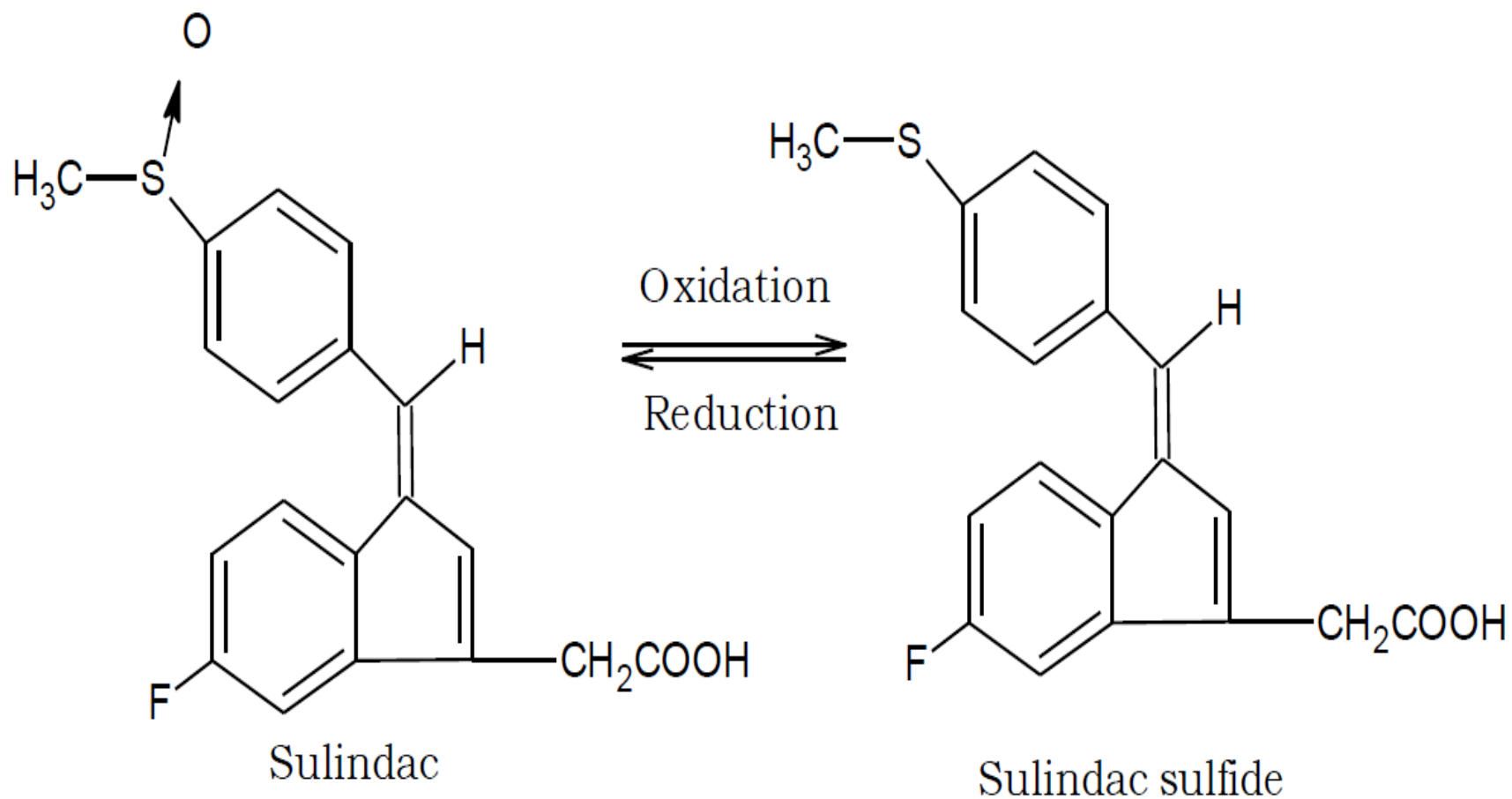


Minimizing Pain at Site of Injection

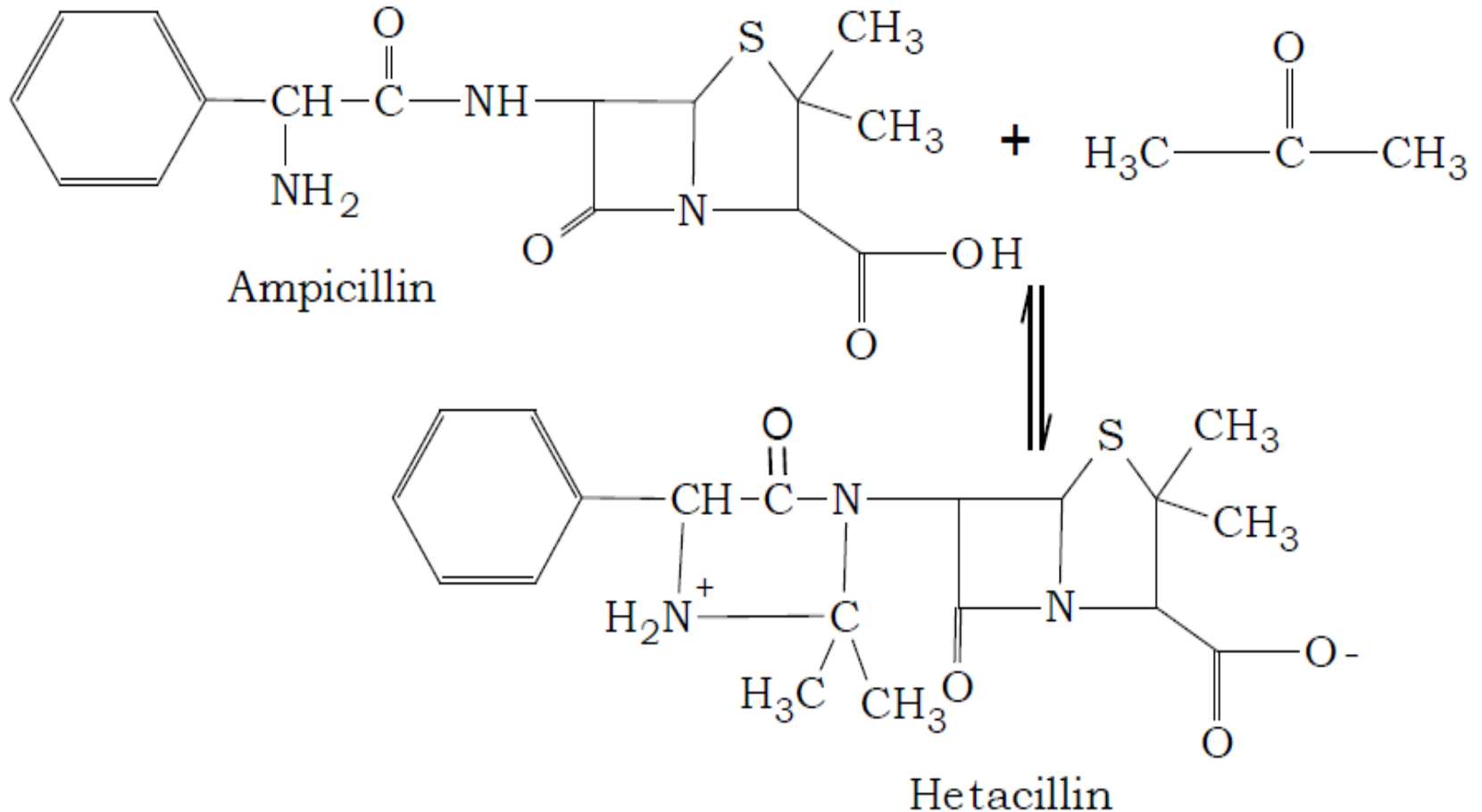
(a) Clindamycin-2 dihydrogen phosphate- prodrug of clindamycin



Alteration of Drug Solubility



Enhancement of Chemical Stability



Use of Prodrugs to Overcome Pharmacokinetic Barriers

To Overcome Absorption Problems

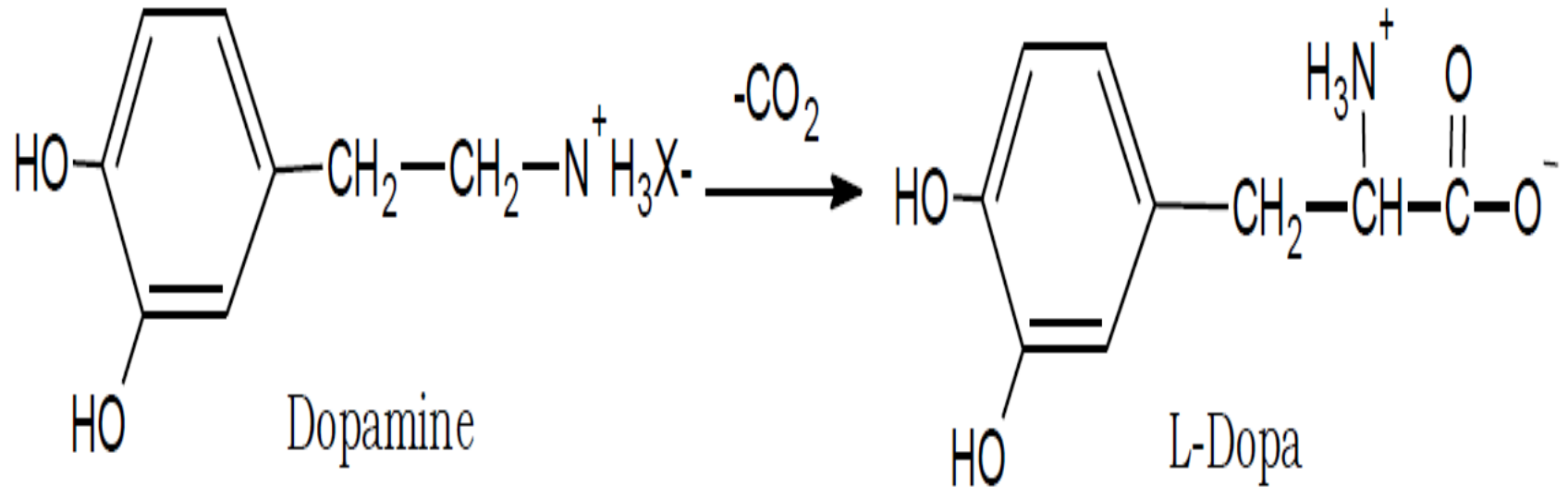
A. Enhancement of Oral Absorption

B. Enhancement of Ophthalmic Absorption

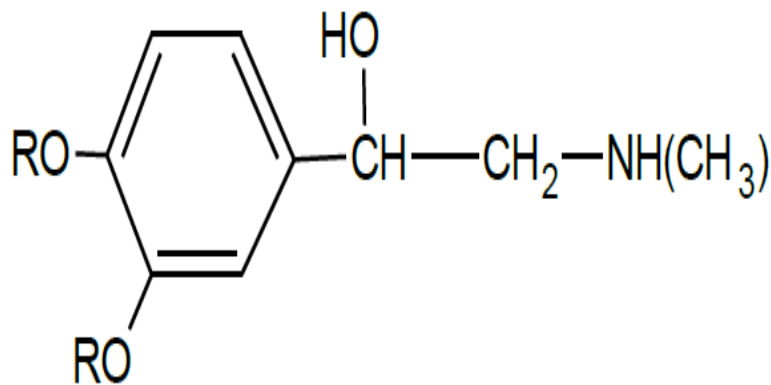
C. Enhancement of Percutaneous Absorption

Enhancement of Oral Absorption

(c) Dopamine prodrug



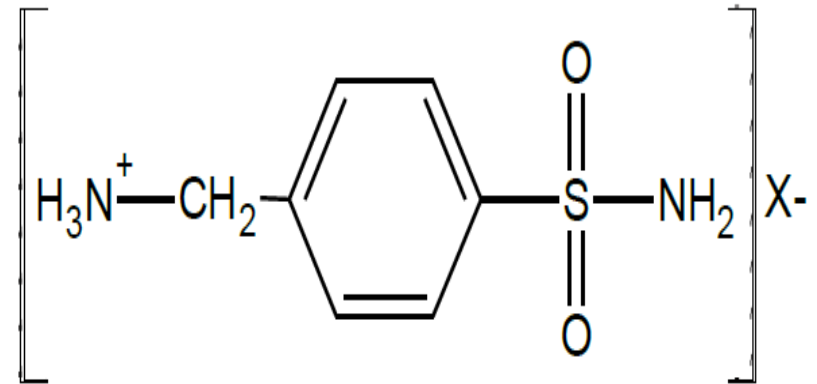
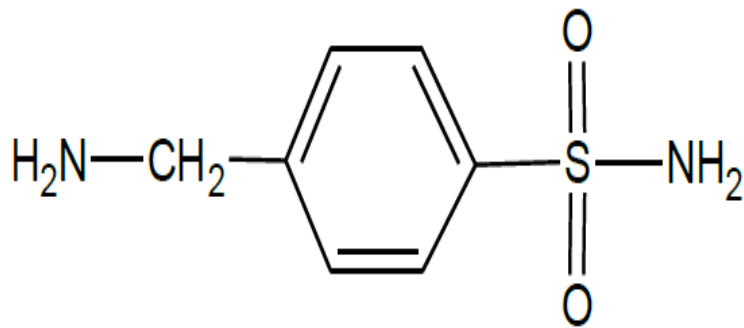
Enhancement of Ophthalmic Absorption



R=H Epinephrine

$$R = \begin{array}{c} \text{O} \\ || \\ \text{C} - \text{CH}_3 \end{array}$$
 Dipivalyl derivative of epinephrine

Enhancement of Percutaneous Absorption



Mefenide

$\text{X}^- = \text{Cl}^-$

Mefenide acid salt $\text{X}^- = \text{CH}_3\text{COO}^-$

References:

- Wilson and Gisvold Textbook of Organic Medicinal and Pharmaceutical Chemistry; Delgado JN, Remers WA, (Eds.); 12th ed., 2011.
- http://shodhganga.inflibnet.ac.in/bitstream/10603/3457/10/10_chapter%201.pdf

ANY QUESTION?

THANK YOU

28-Sep-2014